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ABSTRACT

A study identified students' perspectives on quality and nature of learning achieved in a vocational program using a cooperative learning approach. The theoretical framework for analysis of the implementation of a vocational program included Lave and Wenger's (1991) concept of situated learning and the Guile and Griffiths' (2001) model of work experience. A 1997-2001 action research study focused on dynamics as collaborations between schools and businesses were implemented, including how collaboration evolves; the nature and type of collaboration in relationship to the size of organizations; and implementation of partnerships in a vocational training program. The context was a new, high-school-level vocational program to train specialized workers for the pulp and paper sector. Questionnaire and interview data indicated first experiences of cooperative education in the sector were filled with challenges that vocational centers and mills overcame; large majorities of students were satisfied with training and confident of finding a job; and the practicum was not a good example of successful integration in the pulp and paper community of practice. Mills appeared to play the role of a demonstration environment. Many students reported limited access to job operations; mills engaged in training with a focus on productivity; work supervisors saw their role mainly as adapting to the vocational centers' demands rather than being more active; and degree of work autonomy conferred on students was very variable. (YLB)

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Considerations of Learning in the Workplace in Quebec: Pulp and Paper Students' Perspectives

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1- Introduction

Cooperative education is an engaging and stimulating training strategy for involved actors. Because of their integration into the workplace as well as their contact with skilled workers, students are in a position to engage in rich and relevant learning. They also have the opportunity to confirm their vocational interest. For their part, school trainers are able to keep in close contact with their trade and to assess how close the training delivered in school is to the employers' specific needs in terms of expected skills and competencies from future workers. Finally, workplace practicum supervisors take part in a training relationship as well as supervising students. Such a supervisory role allows people to step back from their own daily work and routines. They then have the occasion to verbalize and give meaning to why and how regular operations are accomplished the way they are in this workplace.

Our contribution to this symposium will be to present students' perspectives on the quality and nature of the learning they achieved while studying in a particular vocational program using a cooperative learning approach, which is offered by six school boards in Quebec. In order to do so, we will first present the theoretical framework for our analysis of the implementation of a vocational program. The Guile and Griffiths (2001) typology of vocational training curricula as well as the Lave and Wenger (1991) concept of situated learning will be developed. We will then offer a brief description of the context of the five-year research study we conducted in the pulp and paper vocational training sector. The data generated throughout the implementation of the pulp and paper vocational training program will illustrate the nature of student learning during their integration into this community of practice and will highlight the type of practicum training that has been implemented, according to the Guile and Griffiths typology.

2- The theoretical framework

2.1 The concept of situated learning

Lave and Wenger (1991) have conceptualized learning as a process, situated in a specific context. They offer the following definition:

> "Learning involves the whole person; it implies not only a relation to specific activities, but a relation to social communities; it implies becoming a full participant,

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> a member, a kind of person. In this view, learning only partly—and often incidentally—implies becoming able to be involved in new activities, to perform new tasks and functions, to master new understandings. " (Lave and Wenger, 1991, p. 53)

To be engaged in a learning situation means participating, as closely as possible, in the exercise of a specific practice because it is made up of novel elements, rich in learning opportunities. So, in order for one to learn, one has to have access to a community of practice in a specific field. This access of non-initiates (students) to a community of practice is called legitimate peripheral participation. Lave and Wenger (1991) define it as a process made up of close relationships between non-initiates and initiates (skilled workers). Learning is then related to the different practices of the community, the nature of professional identities, the artifacts that are referred to and produced, and finally types of knowledge and practices that are used and/or developed. Its ultimate goal is to allow non-initiates to become members of a specific community of practice (Lave and Wenger, 1991, p. 29). Learning in this context then means becoming a new person, transformed through the network of relationships between people-contexts- knowledge (Lave and Wenger, 1991, p. 53).

Some authors (Brown, Collins and Duguid, 1996; Hanks, 1991) claim that access to a community of practice can be more open or less open, and, in extreme cases, non-initiates could find themselves at very peripheral to it. In such a situation, the access to the actual practice would be slim. However, some kind of learning is always achieved, whatever access non-initiates have to skilled workers and their practices.

A community of practice is made up of a network of relationships among people and the activities they pursue. It is located in a specific environment; it exists in a particular temporal context and is linked to other communities that share similar interests. A community of practice is interwoven with power relationships among initiates; it controls and selects its members and protects its rights to limit access (Brown, Collins and Duguid, 1996; Lave and Wenger, 1991).

Thus, the concept of practice, seen through this kind of theoretical framework, is at the junction of people and their relationships, their actions and their context. The development and transformation of a practice, therefore, come not only as a consequence of the acquisition of knowledge or competencies, but as the result of careful attention paid to the contexts where practices are carried out and the coherent and relevant integration of resources that people need to refer to and use.

We believe that this concept of situated learning is very relevant to a better understanding of the learning dynamics in the context of a vocational education program delivered through cooperative education. When students enter a pulp and paper mill for the first time with specific learning objectives to be achieved, they take part in a complex socialization process in a work setting. These students will not experience equal access to the various tasks to be performed. One can then assume that a successful integration in a community of practice will allow students to better learn and meet the program objectives.

2.2 The Guile and Griffiths' model of work experience

In order to analyze the students' learning at the end of their year in the vocational program offered in partnership with employers, we have borrowed from a recent European research study that examined how students learn and develop through work experience (Guile and Griffiths, 2001; Griffiths and al. 2001). The research is summarized in the "Typology of Work Experience" that has been used to analyze different vocational training curricula in six different European countries.

The European analysis of the work experience offered to students during their training is based on the six following elements:

- The purpose of the work experience
- The focus of work experience or the activities required from students in the working environment
- The assumptions about learning and development
- The outcome of the work experience
- The management of the work experience
- The role of educators and training providers.

Using these elements characteristics, Guile and Griffiths differentiate five types of practicum training. They are:

- Traditional model
- Experiential model
- Generic model
- Work process model
- Connective model

The models are on a continuum from the traditional model, which requires minimal participation from the workplace, to the connective model, which requires partnerships in all dimensions. The three other models are in between and lead to outcomes that are different, but almost identical in terms of richness and complexity of the training. All the benefits of the traditional model are included in the others while, at the opposite end, the connective model includes the benefits of the others as well as benefits which are specific to it. The following table (Table 1) presents the five models.

The traditional model of work experience: launching students into the world of work

In this model, it is the initial learning situation, the vocational school, which determines what the student will do later in the workplace. The goal of the workplace is to provide the students with opportunities to manage tasks and instructions in order to facilitate their adaptation to the work environment and the acquisition of skills and knowledge described by the curriculum. The work experience, which is often limited to one shop, is mainly perceived as a means to facilitate the learning of the curriculum content. The training providers are asked to supervise the achievement of the program objectives.

The experiential model: work experience as 'co-development'

This model adopts a broader perspective of the work experience. It is based on collaboration between the vocational training [illegible] and the workplace so they become complementary in

facilitating learning. The work experience is now seen as a different learning strategy; it is a practical way to learn. It brings something more to the program of study. The tasks given to the students are opportunities to be

Table 1

Typology of work experience according to Guile and Griffiths (2001, p.120)

Model of work experience	**TRADITIONAL MODEL**	**EXPERIENTIAL MODEL**	**GENERIC MODEL**	**WORK PROCESS MODEL**	**CONNECTIVE MODEL**
Purpose of work experience	Launch into work	Co-development between education and work	Key skill/ Competence assessment	'Attunement' to work environment	'Reflexivity'
Assumption about learning and development	ADAPTATION	ADAPTATION AND SELF-AWARENESS	SELF-MANAGEMENT	ADJUST AND TRANSFER	VERTICAL AND HORIZONTAL DEVELOPMENT
Focus of work experience	Managing tasks and instruction	Managing contributions Plus - recording experiences	Managing action plan and training outcomes Plus -managing situations	Managing work processes, Relationships and customers Plus -adding value for employer -supporting employability	Working collaboratively to apply and develop knowledge and skill Plus 'boundary crossing' 'entrepreneuriability'
Management of work experience	SUPERVISION	ARMS-LENGTH SUPERVISION	FACILITATION	COACHING	DEVELOPING AND RESITUATING LEARNING
Outcome of work experience	Skill acquisition Knowledge of 'work readiness'	Economic and industrial awareness	Assessed learning outcomes	Systems thinking	Polycontextual and connective skills
Role of education and training provider	Provide: formal preparation program	Facilitate: Briefing for and debriefing of work experience	Build: Portfolio of achievements 2	Support: Reflection in and on-action	Develop partnerships with workplace to create: 'environment for learning'

stimulated and to vary their experiences. The work experience is carried out in different workplaces or in different departments within the same organization. Its aim is to help the students to become more mature, to develop their sense of responsibility, to become more aware of the economic and industrial development of the sector where they will work as well as to develop their capacity to adapt to change. This type of training requires considering each student's developmental process. It requires negotiation of clear objectives between the school and the workplace. The role of the trainers is to facilitate the briefing and debriefing of the work experience in order to contribute to the students' personal and social development.

The generic model: work experience as an opportunity for key skill assessment

This model adopts a generic perspective on learning. It considers the outcomes, the results of the training without prescribing any structure or content. In this student-centred approach, the students are asked to formulate their own action plans for work experience. This plan serves as a contract between the student and the workplace and facilitates the assessment. The teachers become facilitators and assist students in assembling their portfolio of achievement.

The work process model

The purpose of the work experience in this model is to help students adjust themselves to the changing context of work by participating in different communities of practice. The students are asked to understand all aspects of the work process and to relate to formal as well as informal learning. They are also asked to participate in all dimensions of the work process by being involved in production, building relationships with coworkers and dealing with the clients. They are part of the production team and provide added value to the employer. Through coaching, the student learns to identify learning opportunities in the workplace. He progresses by adjusting himself to the needs and expectations of the organization. The educators' role is to support reflection about the action.

The connective model of work experience

The work experience is an environment where reflexivity takes place. Every aspect of the work environment and the organization of work is an opportunity to stimulate learning. The students are encouraged to learn how to learn and to develop new capacities. They are asked to use the knowledge and skills learned at school to question what they observe in the workplace and to rethink and re-conceptualize their knowledge and experience. In this model, the students work in close relationship with the other employees and apply what they already know while developing new skills and knowledge.

They are able to transfer and enlarge on what they know to other workplaces. They interact with the other employees, participate in solving technical or organizational problems and reflect on the 'whys' and 'hows' of these interactions and the processes implemented to solve the problems. This type of student involvement in all the facets of the workplace is characterized by relationships between the formal learning done in the school and the informal learning generated in the workplace. The students develop polycontextual and connective skills. They also get ready for a variety of professional situations and prepare to become dynamic workers in sectors

requiring a high level of performance. The trainers and the workplace develop partnerships to create environments to foster learning within the workplace.

3- Vocational training program in pulp and paper: the research context

3.1- Context of the action research

From 1997 to 2001, we conducted an action research study focussing on the dynamics at play as collaborations between schools and businesses were implemented. More specifically we wished to understand how collaboration evolves, to describe the nature and the type of collaborations in relationship to the size of organizations and to model the implementation of partnerships in a vocational training program as well as to understand its process.

After establishing a picture of the collaborations that existed in Western Quebec between schools and enterprises, we were then ready to develop and implement a pilot program in collaboration with businesses, using the shared knowledge generated in the research thus far. We were invited to work with the school personnel in a school board of the Outaouais region, busy with implementing a new, high-school level vocational program to train a specialized workers for the pulp and paper sector.

The year 1998-1999 was the first year that a new, cooperative-like program was implemented, alternating time in school with time in the workplace. The hours of practicum in the pulp and paper mills went from 75 hours to 350-405, a 300% increase.

This program is taught in six school boards throughout the province of Quebec. In 1999-2000, 175 students were registered and 34 pulp and paper mills opened their doors to them. A total of 164 work-based trainers were involved in the training. In order to study the implementation of the cooperative program as well as assess the roles assumed by each partner and the perspective each partner had regarding this kind of training situation, the following data collection procedures were applied:

- The students in the pulp and paper program (175 students in 1999-2000) across the six school boards in Quebec answered three questionnaires administered according to their practicum schedules. The questionnaires aimed at identifying the expectations (first questionnaire given before the first practicum), the learning (second questionnaire administered between the first and second practica); and overall appraisal of the training from a cooperative education structure (after the third and final practicum).

- Group interviews with the students from the six school boards were conducted at the end of the training (Spring 2000).

- Semi-structured interviews with teachers in the pulp and paper program and representatives of some of the pulp and paper industries in each of the six regions were organized (Spring, 2000).

3.2- The nature of the training program in pulp and paper

Training objectives aim at developing competencies: 1) regarding health and security at work as well as sensitizing students to environmental protection; 2) related to concepts and basic skills involved in the work in pulp and paper mills; 3) in the transformation of pulp; 4) in the proper use of various machines and specialized equipment; 5) in the social skills fostering integration in school as well as the workplace (Quebec Department of Education, 1998).

According to our data, students registered in this program were mature (mean age of 25), 84% were male and had already accumulated work experience (average of 5.9 years of work experience).

3.3- Profiles of industries that have accepted students for practical training

The thirty-four private sector mills that accepted registered students during 1999-2000 constitute a powerful industrial sector in Quebec. Many mills have modernized their technology in order to keep up with competition in international markets. This community of practice is characterized by its hierarchical work structure and its general aims, which can be summed up in two words: productivity and competition. These factors are essential to understanding the access to work given to practicum students during their stay in the mills as well as the nature of their learning.

3.3.1- The hierarchical work structure

Work structure in the pulp and paper area is very clearly outlined and highly hierarchical. Whatever their education, the workers will occupy sixth-hand jobs on the production line when hired, meaning that they are not working directly on the production line but perform secondary activities. They will then slowly move up the line, depending on job openings, so that one day they will work directly on the production line. Unions are powerful actors in this work culture. They have the mandate to protect such a work structure, to protect secure jobs and still today, they promote seniority as a criterion for upward mobility in the organization. This last element represents an important barrier to work access for future workers as well as to the openness this community of practice has towards students, which can vary widely.

3.3.2- Productivity and market competition

The pulp and paper industry is a competitive sector. Productivity and benefits are central objectives. This industry has made huge financial investments over the past few years in order to modernize its equipment. The goods produced must meet international quality standards in order to stay competitive. This work culture can be summed up by the proverb, "Time is money."

3.4 Conditions of practicum in the pulp and paper mills

Teams of workers perform in clusters of operations. Students are linked to one team at a time and rotate from one team to the next. They thus establish contact with many workers and develop relationships with many supervisors during their stay.

Mills express their satisfaction with taking practicum students. They stress two main reasons for their decision to collaborate with vocational centres. The first one is related to the social role that the mills recognize they play in their communities, in fostering regional development and facilitating the upgrading of the local people's skills. The second rests upon their own forecast of hiring needs in a short-term. Mills agree to take students in times of hiring. Employers get multiple benefits from this decision. On the one hand, they contribute to the training of a skilled workforce and, on the other, since they take in many students, they can choose those who are most skilful and show positive work attitudes. However, during the practicum, contrary to other sectors where cooperative education is in place, students are not seen as contributing to the mills' productivity. Because time/machine costs are high, one can even hypothesize that one of the work teams' roles is to closely supervise the students they are responsible for so that their involvement will not slow down production. Furthermore, students' actions must not compromise personal or team security.

4- Learning dynamics: access to the community of practice in pulp and paper sector of activity

4.1 Access to tasks

It has been said previously that the work structure is clearly outlined and hierarchically defined. In spite of this very strict organization and slim margins for manoeuvring in the work structure, 30% of students report having learned machine operations in the first practicum and 36% did so during the second one. One can then assume that proximity to real tasks was possible for those students. During the interviews, students expressed very clearly how important it is for them to have direct contact with machines. How much they appreciate their practicum is furthermore directly linked with direct, concrete manipulation rather than being passive observers. We learned, for instance, that 88% of students from one school board were unsatisfied with their second practicum because they were not allowed to perform some tasks. They could only observe others. Furthermore, in this particular case, they were not welcome by mill workers.

We asked, in the second questionnaire, what could be done to improve the third and last practicum. Increased work time and a way of making the students feel more comfortable in the mills were the suggestions most frequently mentioned by the students from the six school boards.

4.2 Access to actors: supervisors, work colleagues

When reflecting upon their training experience, students indicated that they have an important role to play in their integration into this kind of environment. They said that the quality of their practicum rests upon their personal ability to take the initiative in establishing communications with other workers. They also felt very dependent on their trainers (from the mills and from vocational centres). Students experienced a very low degree of work autonomy in the mill environment.

4.2.1- The ability to establish contact

During the interviews, the students indicated that the ability to ask questions is an important strategy for work integration. They maintained that they must be resourceful and interested in the work being done. They also had the feeling of being under the scrutiny of other workers and strongly believed that if their work performance was satisfactory, they would have a better chance of being hired by the mills. They appeared to be under pressure to perform in order to secure their future, since mills are seen as offering good work conditions (salary, work-related advantages).

4.2.2 Dependency to resource persons

The students relied a great deal on the Vocational Centres' trainers in order to get help and support when problems occurred during their practicum. In the first questionnaire, which students filled out before the first practicum, 88% of students expected that their vocational centre trainers would be available and visit them during their stay in the mills. According to 86% of the students, supervisory visits should be done at frequent intervals. Regarding their supervisor in the mill, 87% of students mentioned that they expected that this person to be skilled and have a good knowledge of his job. Furthermore 84% indicated that the supervisor should show sympathy and understanding since the students are new in the trade. They expressed a real need for empathy and support from the vocational training centre and the supervisors. They situated themselves in a dependency relationship, in need of understanding and close follow-up from those two central figures in their training.

In the third questionnaire filled out at the end of the three practica, 52% of students indicated their involvement in concrete job operations and activities related to their future trade as their most significant practicum experience while 33% of them referred to their acquaintance with the work climate in the mills.

4.3- Synthesis

Data coming from the questionnaires as well as from the interviews show that those first experiences of cooperative education in the pulp and paper sector were filled with challenges, which were more or less overcome by the vocational centres and the mills. A large majority of students, however, were satisfied with their training and 98% were confident of finding a job in the pulp and paper industry. Could we then propose this practicum as a good example of a successful integration in the pulp and paper community of practice? The answer is no. Our analysis leads us to conclude that the pulp and paper vocational training program we examined fits the traditional model described in the Guile and Griffiths' typology even though the program was designed to be more than that. The partnership between the actors at the Vocational Centre and the pulp and paper mills has allowed this new co-op program to be implemented. The centre has succeeded in sending each student into the workplace. On the one hand, launching the students into the mills worked very well and was seen as a prerequisite for a successful program implementation. On the other hand, the data show that the roles of the school and workplace communities are traditional: the teachers are in charge of teaching the theory and the workplace provides opportunities to be closer to the machines, to practice what is learned in school and get some concrete experience of what it is like to work in a pulp and paper mill. The students have reported that both institutions did well within that traditional framework and met their

expectations. The students did not expect more from either side. In that context, the vocational centre followed the formal training program and expected the workplace supervisors to make sure the students had the opportunity to do the tasks required by the program.

The cultures of the vocational centre and the mill were however very remote from each other since the mills mostly appeared to play the role of a demonstration environment. Our data show that the welcome given to students was at best lukewarm in some mills. Many students reported a limited access to job operations since, for security and financial considerations, work in this environment is strictly organized and hierarchically structured with no margin for trial and error. As expected within the traditional model of work experience, the mills engaged in training with a focus on productivity, showing a poor understanding of the conditions of work environment learning. The work supervisors saw their role mainly as adapting to the vocational centres' demands rather than playing a more active role in the training of future pulp and paper workers. The degree of work autonomy conferred on students was very variable and it depended a great deal, according to our data, to the work climate and the good will of supervisors.

5- General considerations regarding learning dynamics and access to community of practice

This one case description, while lacking comparisons with other practica carried on in other communities of practice (Savoie-Zajc and Bouteiller, 2001), describes structural dimensions regarding access, and cognitive and emotional learning that should be taken into consideration when planning practica in other communities.

The first observation that could be made deals with the importance of taking into account the nature of the community and the place students are seen to occupy with regard to its productivity. Students' workplace integration appears to depend upon the nature of the business's expectations regarding the practicum. If, when taking in students, the workplace sees them as productive members of this milieu, then one can assume that the access to specific operations will be facilitated and the degree of openness will be greater than in an environment where students are not seen as contributing members. Thus, one can hypothesize that legitimate peripheral participation will be greater when businesses see students as productive manpower. In the pulp and paper case, this was not the situation since supervisory teams were seen to place students into work situations that would not slow down productivity and compromise security.

The second observation pertains to the concept of legitimate peripheral participation itself. As Lave and Wenger (1991) have rightly proposed, access to the community does depend on "the characteristics of the division of labour in the social milieu in which the community of practice is located" (p. 92). In our case, factors like the power of unions and competition among workers brought about by a promotion structure which, still today, values seniority over education were seen as structural barriers that students had to take into account when entering such a place. Interestingly enough, in their discussions, students accepted the whole weight of successful integration, which they saw as depending upon personal characteristics such as resourcefulness or sociability. Those personal attitudes were considered to be elements that would allow them to develop positive relationships with workers and supervisors. While those social dimensions are certainly important, it is surprising that students assume solely the responsibility for success.

A third and last consideration deals with the central role played by supervisors. They have the power to introduce the students to operations or not, but they assume such a power role with cooperative interests in mind, rather than training objectives. They are in effect in between vocational centres and their own employers (mills in our case). Their decisions regarding training will be incorporated into enterprise objectives: the factor of productivity, the work culture in this milieu, the nature of the relationships with clients. Savoie-Zajc (2001) has shown how small engine repair shops, horticultural enterprises and restaurants, which have also engaged in cooperative education, have different corporate interests in mind. These constitute essential guidelines used by supervisors, who decide how to orient students accordingly: direct service to clients and ability to explain the nature of repair (small engine repair shops); productivity in a seasonal contingency logic (horticultural enterprises); rapidity of execution and defiance toward students who are seen as future competitors (restaurants). The point we want to stress here is that corporate interests will not only qualify the nature of access to the community, as it was previously said, but it will also modify and affect the training objectives that students expect to accomplish while on practicum. And the supervisor is a key figure who makes such important decisions for students. Supervisors also appear to make continuous assessments of students and their ability to perform more complex tasks. We have seen that in certain mills, some students could access the machines while others could not, this situational diagnosis being made by supervisors who, in some cases, allowed greater student work autonomy (direct contact with some machines).

The concept of situated learning as a way of attributing meaning to cooperative educative appears to be a rich and fertile theoretical perspective. It allows one to focus upon the facilitating and inhibiting elements that each work culture is endowed with. It also leads to a better understanding that practica for a specific milieu should be structured around the characteristics of each community of practice. There cannot be one cooperative education practicum model that will answer the different needs and expectations of all communities of practice. The structural dimensions of each community of practice should guide the nature and planning of practicum in that community. It would also help to foresee what degree of access to work would be allowed by communities of practice. This would provide guidance for curriculum planners in setting realistic objectives and for vocational centre practicum coordinators in developing strategies to support work integration in businesses and in securing gradual access to concrete practice.

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